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RELATIVE WAGE STRUCTURE IN CHILE, 1957 - 1992: CHANGES IN THE STRUCTURE OF DEMAND FOR SCHOOLING

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Executive Summary

It is commonly hypothesized that moving from protectionism to liberalized trade will increase the demand for goods whose production is intensive in its use of unskilled labor. The argument is that trade liberalization shifts the composition of output towards such goods (raising the relative demand for unskilled versus skilled labor) and subsequently increases the relative wages of unskilled labor. This change in relative prices from the between-industry recomposition of output, would then cause a second-order substitution towards more skilled labor within industries. In sum, this line of reasoning makes two predictions: first, that trade liberalization will compress relative wages, and second, that trade liberalization will cause second-order substitution of skilled for unskilled labor within industries.

My examination leads to a rejection of these hypotheses - at least over the medium-run - for the Chilean case. My earlier work showed, contrary to the above hypothesis, that relative wages moved in favor of more educated workers in the aftermath of trade liberalization. Moreover, this earlier work found that the widening relative wage structure was not due to relative supply changes, nor was it likely due to domestic reforms. I concluded, therefore, that demand changes in the post-1974 period must have moved to favor more educated workers.

This paper demonstrated that the distribution of employment across industries, while experiencing many short-run changes, was not fundamentally different in 1992 than it was in 1960. Nor were the changes in this distribution in the post-1974 period fundamentally different than those underway in the mid-1960's. These findings suggest that within-industry changes were the key to the observed relative wage changes. The importance of within-industry demand changes was supported by my examination of the distributions of schooling within industries, and of the distribution of occupations within industries, where significant educational and occupational upgrading was observed. Finally, my formal disaggregation of demand changes affirmed the key role of within-industry demand changes favoring more educated workers over the 1974-1990 period. Rising relative wages for university graduates in the post-reform period are best explained by within-industry occupational changes and within occupation changes towards more educated workers.

These results for Chile suggest the customary prediction that trade liberalization improves the relative wage

distribution may - at least for some countries - be incorrect. The applicability of these results to other countries remains to be shown. But, because Chile has been widely cited in favor of trade liberalization elsewhere, these results should not be simply dismissed as idiosyncratic.

Widening wage differentials in Chile appear largely due to within-industry skill and occupational upgrading, and these within-industry changes are likely related to modernization which - in turn - is spurred by trade liberalization. In the U.S. and OECD countries economists have observed, to varying extent, widening relative wage structures and concluded that skill-biased technological change is responsible. More modem capital and production methods appear to be increasingly skill-intensive.

Trade liberalization may lead to the modernization of capital because traditional discussions of protectionist regimes argue that protectionism is characterized by over-valued exchange rates and tariffs that shield domestic production of tradeable goods while allowing capital goods in freely. Thus, under protectionism, prices are distorted in favor of imported capital goods, and trade liberalization ought not lead to greater levels of or modernization of physical capital.

However, this story may be wrong or incomplete. Questionably, it assumes that capital goods are cheaper under IS1 regimes. While there is evidence supporting this claim, some goods that are key to modernization and imply skill-intensiveness - notably computers and electronic devices - may not have been categorized as capital goods in the studies cited by Krueger(1990), and may face high tariffs or quotas under protection. Trade liberalization may make it easier and cheap to import these, and their effect could permeate manufacturing, services and commerce. Moreover, the argument may he correct, but incomplete. Trade liberalization could lead to modernization of physical capital for two reasons. First, trade liberalization and export-promotion should free-up the capital constraints restricting the level of imports of capital goods, allowing faster growth in capital goods imports, and diminishing the rationing of foreign exchange and resultant market segmentation. Higher levels of capital imports would lead to modernization. Second, competition may increase, and lead to modernization of production. Diminished market segmentation would enhance competition between domestic firms. And, as often argued, liberalized trade would also increase the competition on domestic producers; and heightened competition would tend to force domestic producers to be more efficient, driving them to modernize production techniques and thereby increase their skill-intensiveness.

This evidence for Chile suggests a very different vision of the effects of trade liberalization than the one often presented. Trade liberalization may spur the accumulation of more modern capital and the adoption of more modern techniques of organization and production. One particular consequence of this would be that trade liberalization could increase the dispersion of earnings. Widening earnings differentials could be problematic, because they could threaten the success of reform and imply direct welfare costs. This raises the issue of whether policies should be designed to temporarily equalize incomes through transfers, whether more gradual liberalization might allow labor supply to respond, and whether educational policies supporting higher education should be strengthened to encourage medium and long-run supply responses that would counteract rising income inequality and contribute to economic growth as well.

Relative Wage Structure in Chile, 1957 - 1992:

Changes in the Structure of Demand for Schooling

by

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- July, **1994** -

This work **is** part of a larger research project with Ricardo Paredes of the University of Chile, without whose substantive data work this paper would not have been possible.

Introduction

The traditional hypothesis regarding the net effects of trade liberalization on labor demand and the distribution of earnings is that trade liberalization generally compresses the relative wages structure - the gap in wages between more and less skilled workers [e.g. Krueger(1990)]. This hypothesis, which I call the "extended Heckscher-Ohlin/Stolper-Samuelson hypothesis" or "HOS-X", builds on the original Heckscher-Ohlin and Stolper-Samuelson theorems, where free trade substitutes for international factor mobility, trade liberalization leads to growth in sectors where countries have comparative advantages based on their factor endowments, and factor prices converge internationally. While Less Developed Countries' comparative advantage generally lies in their stocks of unskilled labor, protectionism distorts prices in favor of capital. Because capital and skill are complements, protectionism raises the relative demand for skilled versus unskilled labor. Therefore, moving from protectionism to trade liberalism shifts the composition of output and employment towards sectors intensive in unskilled labor, raises the relative demand for unskilled labor and increases the wages of unskilled workers relative to the wages of skilled workers. Some variants of "New" Trade theory, on the other hand, argue that trade can raise the international transfer of and premium on new techniques and knowledge, thereby raising the gross returns to schooling.

My earlier work on Chile [Robbins(1994A)] showed that, contrary to the traditional hypothesis, relative wages have moved sharply in favor of more educated workers after trade liberalization. Moreover, that work found that the widening relative wage structure was not due to relative supply changes or domestic reforms. Changes in labor market conditions and regulations after 1974 (particularly labor legislation) should have strengthened the anticipated

movement towards industries intensive in unskilled labor, by lowering direct and indirect labor costs for less educated workers relative to capital and relative to more educated workers.' I concluded, therefore, that the rising dispersion in relative wages was driven by post-1974 demand changes that favored more educated workers.

This paper examines the changing structure of demand over the 1957-1992 period. I distinguish between two types of demand changes. The first demand change - "between" industry change - results from modifications in the composition of output and employment across sectors or industries. Because different sectors or industries use different skill mixes of workers, such between-industry changes can lead to net changes in the total demand for different skill groups. The second kind of demand change - "within" industry change - consists of changes in the mix of occupations or skills within industries.

By the traditional line of reasoning, trade liberalization engenders both between and within-industry demand changes. It will generate first-order between-industry demand changes favoring unskilled workers as the move from IS1 to liberalized trade causes shifts in the composition of output towards industries more intensive in their use of unskilled labor. The increase in the relative cost of capital induced by the policy changes should cause between-industry changes, not only between manufacturing and agriculture, but between different types of service, commerce and manufacturing activities, according to their relative factor requirements. Second-order within-industry demand changes emerge as a consequence of these between-industry changes, since the decrease in the relative wage gap caused by the between-

[1] These Policies include the suspension of labor laws after 1973, persecution of unions through 1979, and pro-business labor legislation in 1979, the Plan Laboral. The Plan Laboral circumscribed union power by outlawing industrial unions, and lowered direct costs by eliminating or reducing overtime payment, and reduced non-wage labor costs (Plan Laboral).

industry demand shifts leads to the substitution of skilled for unskilled labor within all industries.

This line of reasoning generates three predictions regarding the consequences of moving from IS1 to liberalized trade: first, there will be large shifts in the composition of output towards industries intensive in less skilled labor; second, relative wages will become more compressed. And, there will be second-order substitution of skilled for unskilled labor within industries. As explained above, my earlier work showed that in Chile relative wages rose after trade liberalization, and that the rise was not due to supply changes. The remainder of this paper goes on to examine evidence regarding the first and third propositions, which concern the structure of demand changes before, during and after trade liberalization.

The paper is divided into five sections. For between-industry changes to matter the distribution of employment across industries must change and this change should occur within the Greater Santiago Metropolitan area that includes variegated manufacturing, services, and commercial sectors. Section 1 finds that the distribution of employment across industries was remarkably stable over 1960-1992, diminishing the likelihood that between-industry demand changes were important. I also find that the distribution of employment over occupations shifted sharply towards professional and managerial occupations after 1975. Section 2 examines separately the distribution of schooling and occupations within industries, I find large within industry upgrading of schooling and occupations that accelerates after 1975. Section 3 presents a decomposition of demand changes into between and within-industry changes. The results support the previous sections conclusions. I find that within-industry changes favoring workers with higher levels of schooling are the driving force behind overall demand shifts. Section 4 discusses but rejects alternative explanations for rising relative wages over 1975-1992. Section

5 concludes.

Section 1 - Changes in the Distributions of Total Employment over Industries and Occupations

Data and Methodology

The data employed are taken from the University of Chile Household Surveys of 1957 through 1992. They are comparable and representative annual surveys for greater Santiago, with approximately 10,000 persons and 4-5,000 active labor force participants, per survey. During this period, Greater Santiago represents roughly forty percent of Chile's total population and a higher proportion of GDP. While wages in greater Santiago will closely parallel those in agriculture (due to the close physical proximity of the agricultural heartland to Greater Santiago) using Greater Santiago data to study employment distributions is more limiting. The findings in this section reflect demand shifts mostly outside of agriculture. Two points are important in this regard. First, the role of agricultural employment expansion can be overemphasized; the share of employment in agriculture only expanded from 18 percent in 1976 to 19 percent in 1991 (Instituto Nacional de Estadistica). Second, HOS-X predicts important changes in the composition of non-agricultural activities and employment. Thus, the simple trade theory leads us to expect shifts of employment in Greater Santiago towards more unskilled labor intensive sectors, and Greater Santiago employment shifts to be the major component of changes in relative wages documented there.

My methodology largely follows that of Katz-Murphy(1992) (hereafter "KM92"): an essentially non-parametric approach in the tradition of Welch (e.g. Welch (1979)) and Murphy-Welch(1991). This approach examines the wage and employment behavior in terms of

demographic "cells" that are divided into sex, education and experience groups. This approach is attractive because it, unlike most regression approaches, imposes little structure on the data, is highly robust, and has firm theoretical underpinnings [see Murphy and Welch(1991) and Katz-Murphy(1992)]. Wage estimates use employed workers to maximize comparability. Employment is reported two ways: first, in terms of the sub-total of hours per cell divided by total hours worked, or relative hours; this corresponds to traditional reports of employment levels, while allowing for hours worked to vary. Second, employment is sometimes reported in terms of efficiency-unit weighted hours worked, where efficiency units are estimated as the average normalized wages per cell over the 1957-1992 period. This second approach allows for correct aggregation across heterogeneous workers, where one can obtain the desired stocks of human capital. When examining wages or employment without respect to industries or occupations, I divide the population into forty-eight cells representing the two sexes, six school groups and four experience groups. When examining demographic groups within industries or occupations, I use four school and two experience groups. When examining finer aggregates I used averages of proximate years to calculate employment densities, and occasionally, relative wages to minimize potential sampling error.

THE DISTRIBUTION OF EMPLOYMENT ACROSS INDUSTRIES: 1960-1992

For between-industry changes to be large, the distribution of employment across industries must change over time. Given the large policy reforms, in particular trade liberalization, I would expect that the distribution of employment across industries to change significantly, both towards agriculture and - within Greater Santiago - towards industries intensive in unskilled

labor.

Panel A of Table 1 presents the correlations of the shares of employment by industry for paired years. It uses the seventeen industry classifications below.[2]

Industry Codes	Industries
1	Agriculture, Mining and Fishing
2	Wood and Paper Manufacturing
3	Textiles
4	Metallurgy & Machinery
5	Chemicals & Petroleum Products
6	Other Industry
7	Construction
8	Co-crcc
9	Public Administration & Military
10	Services: Financial & Real-estate
11	Services: Repair
12	Services: Personal
13	Services: Domestic
14	Services: Sanitation & Social
15	Services: Education & Health
16	Transportation & Public Utilities
17	Other

Examining correlations of both the levels of distribution of employment shares over industries in Panel A, and the percentage changes in those shares in Panel B, across different intervals, establishes three important points. First, the basic structure of industrial employment remained intact throughout the 1957-1992 period. In Panel A I find that they are highly correlated across all years, and follow no trend. Correlations of average employment shares over ten intervals from 1957 through 1992 are all above 0.90 and average roughly 0.94. Moreover, at most the correlations decline slightly from the 1960's to the post-reform era. The shares in the 1957-1960 have correlations 0.95 with 1966-1970, and 0.93 with 1990-1992. Similarly, the shares of 1966-1970 have correlations 0.99 with 1971-73 and 0.97 with 1990-1992. Second, in Panel B I find

[2] We focus on activities two through eight, and ten through sixteen, giving less attention to Agriculture, Mining and Fishing, because that sector is under-represented in the survey, and because in Public Administration and Miliary we cannot distinguish military from non-military, and, because 'Other' is a residual category of activities.

that the post-reform period follows a consistent growth pattern, save for the depression period. The correlation of the percentage changes in the distribution of total employment shares between 1975-1978 and 1988-91 is high and positive, at 0.6. However, the third conclusion is that the post-reform period's growth pattern did not differ strongly from changes already occurring in the 1960's, prior to the opening of the liberalization of trade and domestic policies. The correlation between the changes occurring over 1960-1969 with 1975-1978 and 1988-1991 were both positive, and respectively 0.16 and 0.3.

Table 1. Correlations of Levels of Total Employment by Industry and Changes in Total Employment.

Panel A: Levels of Total Employment

Year	1960	1968	1972	1975	1978	1980-81	1982-83	1985	1988
1968	0.95								
1972	0.94	0.99							
1975	0.93	0.98	0.98						
1978	0.95	0.99	0.99	0.98					
1980-81	0.92	0.96	0.97	0.99	0.98				
1982-83	0.92	0.91	0.92	0.91	0.95	0.92			
1985	0.94	0.96	0.98	0.96	0.99	0.97	0.97		
1988	0.94	0.97	0.98	0.98	0.99	0.99	0.94	0.98	
1991	0.93	0.97	0.98	0.98	0.99	0.99	0.94	0.98	0.99

Panel B: Percent Changes in Total Employment

Interval	1960-69	1972-75	1975-78	1980/81 1982183	1985-88
1972-75	0.34				
1975-78	0.16	-0.74			
1980/81 - 1982/83	-.011	-.048	0.67		
1985-88	-0.21	0.30	-0.50	-0.04	
1988-91	0.30	-0.49	0.59	0.62	0.18

These observations of a relatively stable distribution in employment structure across industries over the 1957-1992 period implies that the between-industry demand changes are unlikely to be able to explain all or most of the overall changes in relative demand structure that must have occurred. Shifts of employment out of Greater Santiago towards agriculture should have, on average, increased the relative demand for unskilled, not skilled labor. Therefore, if

between-industry shifts explained the pattern of overall demand shift in favor of more skilled labor, one should observe them within the activities in Greater Santiago - but I do not find them. Before turning to the within-industry distribution of employment, I first examine the pattern of employment across occupations.

THE DISTRIBUTION OF EMPLOYMENT ACROSS OCCUPATIONS

Table 2, which reports the percent changes in the distribution of total employment (in hours) across occupations, shows a major redistribution of employment in the 1960's from Managerial, Professional and Sales and Clerical to Production and Service workers. The first three declined twenty-four, sixteen and thirteen percent, respectively, while the latter grew eight percent. However, this pattern is reversed in the post-reform era, when there were major increases in the shares of employment corresponding to Professional and Managerial occupations in the post-reform period. From 1975-1991 the share of managers grew nineteen percent and the share of professionals grew thirty-three percent, but the share of sales and clerical grew only four percent, while the share of labor and services declined six percent.[3]

[3] Over the depression period, 1980/1-1982/3, there was an eleven percent drop in the share of Production and Service occupations, while the shares of Managerial, Professional and Sales and Clerical rose; the twenty-six percent rise in the share of employment in Sales and Clerical occupations during this period likely an increase in Informal employment responding to the collapse of low-paying Formal Sector employment. Because subsequently this share dropped only slightly, this Informal employment may have become semi-permanent.

Table 2. Percent Changes of Employment Distributions: Occupations

	Intervals								
Occupation	1960 - 1969	1970 - 1975	1975 - 1978	1980/1 - 1982/3	1985 - 1988	1988 - 1991	1960 1991	1975 1991	1985 1991
Managers	-0.24	0.04	-0.02	0.18	0.31	0.01	-0.25	0.19	0.33
Professional	-0.16	-0.04	0.12	0.16	-0.05	0.04	0.38	0.33	-0.01
Sales & Clerical	-0.13	0.002	-0.00	0.26	-0.02	0.00	0.01	0.04	-0.02
Production and Service	0.08	-0.00	-.02	-0.11	0.02	-0.01	-0.05	-0.06	0.01

Intervals: All intervals are three-year centered averages, except 1980/81, 1982/3 which are two year averages. 1970 was excluded, as a difficult year to classify, because of the Allende election at year-end and attendant uncertainty.

The basic structure of industrial employment remained intact throughout the 1957-1992 period; that changes in the distribution of employment over industries in the post-reform period followed a consistent growth pattern; and, that the post-reform period's growth pattern did not differ strongly from changes already occurring in the 1960's, prior to the introduction of trade and political liberalization. Thus, regime change did not lead to the permanent collapse of any traditional industries and many patterns in the post-1974 period followed trends begun in the 1960's. However, the occupational distribution changed significantly in the post-reform period. The shares of production and service occupations fell, while the shares of professional and managerial occupations rose sharply. Since shifts in overall employment across industries were not severe, changing patterns in the distribution of employment across occupations suggest that changes in the relative demand for schooling may have derived principally from changing distributions of occupations within industries. In addition, note that the rising educational content within occupations suggests that there was significant within-industry educational upgrading. To explore this further, I turn next to direct examination of the educational distributions within industries and their changes over

time.

Section 2 ▪ Changes in the Distributions of Schooling and Occupations Within Industries

Earlier, I discussed the distribution of employment across industries and across occupations as well as the changes in those distributions. Here, I examine the changes in the distribution of hours worked **within** industries, first examining schooling, then occupations.

Changes in The Distribution of Schooling Within Industries

Table 3 below, presents a tabulation of changes in the within-industry distribution of schooling for 1960-1968 and 1975-1991 periods (for more detail see Appendix C). It counts the numbers of industries within which there were changes in the share of each schooling category (industry one is excluded, because of it's small size, though it follows general trends). In both periods there is a major decrease in the within-industry share of workers with primary education, and increases in the shares of workers with secondary and university educations. Of the sixteen industries, twelve in 1960-1968, and fifteen in 1975-1991 decreased their shares of workers with primary education. This was associated with increases in the shares of workers with university and secondary 'or Special educations.

Between 1960-1968 and 1975-91, the movement to higher within-industry densities of Secondary and University workers accelerates. In the former period, eleven industries increased their shares of secondary workers, while in the latter fifteen increased their shares. Five industries increased their share of university workers in the former period, while seven increased their shares in the latter.

Table 3. Tabulation of Changes in the Distribution of Hours Worked Within Industries across School Groups: Frequency of Changes for Intervals 1960-1968 and 1975-1991

	1960-1968	1975-1991	Difference (column 3 - column 2)
Increases			
Primary	3	1	-2
Secondary	11	15	4
University	5	7	2
Special	9	7	-2
Decreases			
Primary	12	15	3
Secondary	4	1	-3
University	6	3	-3
Special	4	5	1
Summary	Shift out of Primary and into Secondary, Special and University (in that order).	Shift out of Primary and into Secondary, University and Special (in that order).	Sustained movement out of Primary. Acceleration of Movement into Secondary and University.

Industry one was not included, given its small size.

As discussed earlier, this evidence is consistent with within-industry demand changes. However, these changes may be the result of an economy-wide educational expansion, leading to a higher educational content of occupations, rather than a shift in the composition of occupations and tasks within firms. The former would not typically reflect technical change within industries, whereas the latter would.

I do find a big shift in the distribution of occupations within industries. Table 4, which reports changes in the occupational distribution within industries (see Appendix C for more detail), shows big movements in the distribution of occupations with higher average educational levels in the post-reform period. This is consistent with technical demand changes within industries. In the earlier 1960-1968 period, there is a significant movement in the distribution of occupations from Manager or Professional occupations to Sales and Clerical or Laborer and Service occupations - which, for simplicity, I call "down-grading", and the opposite movement ("up-grading") in my references to the average skill or schooling

content of the occupations. In the 1975-91 period, however, this trend makes a striking reversal. The tabulations reported in Table 4 show that in 1960-1968, ten industries experienced occupational downgrading and only two experienced upgrading. In the 1975-1991 period, however, eight industries experienced occupational upgrading, and only one experienced occupational downgrading. Of less importance were "lateral" movements (defined as from Sales and Clerical to Laborer and Service or vice-versa) which favored Laborer and Service occupations in the earlier period, while becoming neutral in the later period.

Table 4. Tabulations of the Changes in the Distribution of Hours Worked Within Industries across Occupations
Frequencies of Changes over the Intervals 1960-1968 and 1975-1991

Nature of Change In Occupational Skill Content	1960-1968	1975-1991	Difference (Column 3 ▪ column 2)
"Up-grading": Sales and Clerical or Laborer and Service, into Manager or Professional	2	8	b
"Down-grading": From Manager or Professional to Sales and Clerical or Laborer and Service	10	1	-9
"Lateral ▪ SL": from Sales and Clerical to Laborer and Service	5	2	-3
"Lateral ▪ LS": to Sales and Clerical from Laborer and Service	3	3	0
Summary	Large "Down-grading" of occupations	Large "Up-grading" of Occupations	Reversal of trends in occupational distribution: from "Down-grading" to "Up-grading"

"Up grading" and "Down grading" are not intended no value loden, but serve as abbreviations, and refer to the average skill (or schooling) content of the occupations.

Summary

The previous and current sections support the conclusion that, while between-industry changes may have played a role in increasing the school wage gap, within-industry changes favoring higher levels of schooling and occupations with higher cognitive and educational

requirements played a stronger role. The change from IS1 to liberalized trade did not lead to the permanent collapse of traditional industries or major changes in the distribution of employment across industries. At the same time, shares of production and service occupations fell, while the shares of professional and managerial occupations rose sharply.

While changes in the distribution of employment across industries are modest, the current section demonstrated important within-industry changes. In both 1960-1968 and 19751991, there was a large decrease in the within-industry share of workers with primary education, while in the latter period the increase within industries to higher densities of Secondary and University workers accelerated. The within-industry changes in occupational distributions are even sharper. There occurred a major redistribution of occupational 'upgrading' within most industries, favoring Professional and Managerial occupations.

I began this section arguing that, if within-industry changes were an important explanation of the widening school wage differentials, I would expect upgrading of schooling and occupational categories within industries in the post-1974 period. This is what I found. It appears that much of the widening school wage gap may be attributed to within-industry demand changes favoring, not just higher schooling levels, but managerial, professional occupations. In the next section I present a decomposition of overall demand changes into between and within-industry demand changes that is complementary to the current discussion.

Section 3 - Decomposition into Between and Within-industry Demand Changes

The demand decomposition technique used in this section follows KM92, which can be viewed as a generalization of the standard fixed-coefficients index, with employment

measured in efficiency units instead of hours [see KM92, Freeman(1975,1979,1980)]. The approach taken in KM92, and here, is to estimate within-industry demand changes as the residual between projected "overall" demand shifts and "between" industry demand shifts. "Overall" demand shifts are measured by using average manning ratios within industries and occupations, and calculating the projected demand changes from shifts in both industry and occupational employments. Between-industry changes are measured by projecting demand changes from shifts in the employment pattern across industries, assessing employment in constant-valued efficiency units instead of employment or hours. "Within" changes are then calculated as the difference between "overall" and "between" changes. More formally, the between-sector change in demand for group k measured relative to base year employment of group k in efficiency units, E_K is:

$$\Delta X_{kd} = \Delta D_K/E_K = \Sigma_j (E_{jk}/E_k)(\Delta E_j/E_j) = \Sigma_j \alpha_{jk} \Delta E_j/E_k,$$

for the jth sector. Here E_j is the labor input in the jth sector in efficiency units[4], α_{jk} $(=E_{jk}/E_j)$ is group k's share of total employment in efficiency units in the jth sector in the base year, which I normalize into an index of relative demand shifts using employment measures so total employment in efficiency units sums to one in each year. This formulae is used to calculate the three groups of demand shifts: the overall demand shifts (by letting "j" vary over both industries and occupations) and between demand shifts (letting "j" vary only over industries) and then calculating the within-industry shift as the residual.

Table 5, below, reports the demand decomposition for nine periods, between 1966 and 1992. My principal finding here is that demand shifts favoring more educated workers

[4] Aggregation here uses an efficiency units approach, where the weights to a ggregate across labor types are average wages for the respective types over the period.

derived both from between-industry and within-industry demand changes, with the largest share coming from within-industry demand shifts.

First, I examine the results for the 19751990 period. In the top panel of Table 5, I see that overall demand shifts are mostly negative for workers with primary education, but positive for higher levels of education. In the second panel I find negative between-industry changes for male workers with primary education, though for women between sector shifts go from positive to zero. For workers with secondary and university education between-industry changes are positive, but negative for males with Special education. Between changes are positive for females with university and Special educations. Finally, the third panel shows us that within changes are negative for males workers with primary educations, but strongly positive for males with university or Special education. This pattern of skill-biased within-industry demand shifts is also found for females, though women, unlike their male counterparts with secondary educations, also experienced strong positive within-industry shifts. After 1990 the pattern of demand shifts reverses, so that both between and within-industry changes turn positive for workers with primary c&cation, and mostly negative for workers with higher levels of education.

Table 5. Decomposition of Demand Changes into Overall, Between and Within

Overall Changes

SEX	SCHOOL	1966-70	1974-76	1975-90	1985-90	1990-92	1957-92
MALES	Primary	-0.02	-0.34	-0.43	-0.24	0.45	0.04
	Secondary	-0.10	0.20	0.17	0.09	-0.22	-0.96
	University	0.24	0.27	0.55	0.34	-0.77	0.41
	Special	0.20	-0.18	0.06	0.19	-0.13	0.51
FEMALES	Primary	-0.18	0.11	-0.18	-0.19	0.47	0.17
	Secondary	-0.14	0.23	0.38	0.36	-0.17	0.45
	University	0.26	0.31	0.47	0.23	-0.89	0.19
	Special	0.07	0.41	0.55	0.29	-0.69	0.22

Between Changes •

SEX	SCHOOL	1966-70	1974-76	1975-90	1985-90	1990-92	1957-92
MALES	Primary	0.04	-0.20	-0.24	-0.08	0.21	0.22
	Secondary	-0.12	0.10	0.12	0.10	-0.13	-1.50
	University	0.15	0.22	0.29	0.10	-0.42	0.14
	Special	0.02	-0.32	-0.21	-0.07	0.12	0.24
FEMALES	Primary	-0.12	0.15	0.05	0.02	0.16	0.23
	Secondary	-0.13	-0.01	-0.02	-0.08	0.18	0.33
	University	0.16	0.14	0.30	0.08	-0.58	0.16
	Special	0.10	0.17	0.27	0.05	-0.40	-0.23

Within Changes

SEX	SCHOOL	1966-70	1974-76	1975-90	1985-90	1990-92	1957-92
MALES	Primary	-0.06	-0.14	-0.19	-0.16	0.24	-0.18
	Secondary	0.02	0.10	0.05	-0.01	-0.09	0.54
	University	0.09	0.05	0.26	0.24	-0.35	0.27
	Special	0.18	0.14	0.27	0.26	-0.25	0.27
FEMALES	Primary	-0.06	-0.04	-0.23	-0.21	0.31	-0.06
	Secondary	-0.01	0.24	0.40	0.44	-0.35	0.12
	University	0.10	0.17	0.17	0.15	-0.31	0.03
	Special	-0.03	0.24	0.28	0.24	-0.29	0.45

Vote: Special Education is non-university post-Secondary education.

These results help explain my earlier findings for relative wage changes. Earlier, I found that from 1974 through 1990, except for the period of the depression, relative wages moved rapidly in favor of workers with university educations, and that relative supply changes could not explain these changes. The findings here - supported by the findings in the previous section, where I examined the distributions of schooling and occupations within industries - strongly suggest that this widening in relative wages was due to within-industry demand changes. At the same time, between-industry changes also favored more educated workers. These shifts in demand match the rising relative wages over 1975-1990, and go counter to the extended Heckscher-Ohlin/Stolper-Samuelson hypothesis which predicts between industry shifts towards unskilled-labor-intensive activities, and only second-order within-industry skill-upgrading as the relative wages of skilled workers *decline* - whereas I find rising relative wages.

Only in the post-1990 period do I find the relative wages declining. The disaggregation of demand shifts suggests this was due to a reversal of the earlier pattern, with both within and between-industry shifts turning to favor workers with primary educations.

The results of this section's disaggregation of demand changes strongly supports the previous section's results, where for the post-1974 period there was a big movement in employment towards occupations with higher cognitive requirements and average educational levels. For men and women, I find there were large within-industry shifts and positive - though smaller - between-industry shifts toward workers with more education in the 1974-1990 period. Because of the earlier results showing that supply changes could not explain the increase in relative wages over this period, I conclude that these demand shifts were responsible for the rising wage gap.

SECTION 4 - ALTERNATIVE EXPLANATIONS

I have argued that rising relative wages were largely driven by skill-biased demand leading to within-industry demand shifts favoring more educated workers. In this section I examine alternative explanations for rising relative wages after 1975. Four key facts for Greater Santiago from Robbins(1994A) and the current discussion need to be reviewed before proceeding. First, relative wages rose over most of this period, and in pro-cyclic fashion. Second, relative public spending on education (on higher education versus basic education) dropped. Third, the relative supply of workers with higher education grew or was constant. Fourth, there was strong within industry upgrading of schooling and occupations that require more schooling, while between industry shifts were small. There are five potential alternative explanations for these facts: changes in relative spending on education; labor market reforms; minimum wage policies; high unemployment that is largely unskilled; and implicit contract arguments linked to risk sharing and the presence of specific human capital. I examine each of these explanations below.

Relative Spending on Education

The percent of public spending on higher education dropped after 1980. Controlling for other factors, this would have tended to widen relative earnings by constricting the relative supply of higher education. However, non-neutral demand changes that were unrelated to government educational spending must have been involved, since the relative supplies were constant or increased.

Labor Market Reforms

Could labor market reforms have contributed to the rising relative wages observed after 1975? To do so, labor market reforms leading to greater market power or greater safeguards for unskilled workers' wages would need to decline after 1975. However, if anything, the opposite occurred. In 1973, the military government that assumed power immediately declared unions illegal and suspended the extensive labor code dating from the 1930's. Thus, there was a big initial shock in labor market regulations and union power in 1973. However, the repression of the labor movement gradually relaxed somewhat, and in 1979 the Plan Laboral institutionalized the ***de facto*** rules of the game, and if anything, strengthened labor protection. Subsequently, the trend has been for the further, gradual relaxation of labor repression. Thus, this trend should have tended to raise the wages of less skilled workers over the 1975-1990 period, and cannot explain the observed facts.

Minimum Wages

Unless minimum wages are used as an index to other wages through collective bargaining, or similar mechanisms, their effects should largely consist in a truncation of the distribution of employed workers - a reduction in the number of whose productivity falls below the minimum wage - with zero or second order effects on the wages of those still employed. Much work on LDCs ignores this theoretical basis and assumes that minimum wages determine wages for unskilled workers and sometimes average wages.

Let us assume for the moment that unskilled workers' wages in Chile have been set by the minimum wage. Falling minimum wages would lower relative wages. However, this would lead to a substitution within industries towards unskilled labor: the opposite of what

actually occurred. Moreover, while minimum wages would have to fall to cause relative wages to fall, the opposite occurred over most of this period. Relative wages were strongly pro-cyclic: falling as unemployment rose [see e.g. Robbins(1994A)]. In fact, some [e.g. Cortazar(1980) and Edwards and Edwards (1987)] argue that especially over the 1975-1980 period, indexing on previous, but decelerating, inflation led to a rising real minimum wage that caused much of the increase in unemployment. Minimum wages simply moved in the wrong direction over most of this period for them to explain relative wages. If minimum wages had any impact, they should have tended to lower relative wages over most of this period. However, this brings us to the next potential explanation of widening relative wages: unemployment.

Asymmetric Composition of Unemployment

Some argue rising minimum wages caused high aggregate unemployment and also - at times in the same breath - that high unemployment exerted downward pressure on unskilled workers' wages. This makes little sense, however. For minimum wages to raise unemployment they must rise - a movement which should increase relative wages - so that rising minimum wages and unemployment cannot both contribute to rising relative wages.

Perhaps unemployment had other causes. If unskilled workers are asymmetrically represented in the composition of the unemployed, would this not exert asymmetric pressure on wages, leading to an increase in relative wages? Before discussing the logic of this argument, note that the premise of asymmetric skill-composition of the unemployed is not well established. Aggregate unemployment occurred in large measure because of the downsizing of the public administration and public enterprises, which significantly affected

more educated workers. And movement from protectionism to liberalized trade would lead to a net reduction in the number of jobs of more educated workers [see Krueger(1990)]. Moreover, some Chilean authors have argued that the high levels of unemployment in the 1980's largely reflected unemployed university educated youths seeking employment for the first time. Thus, the composition of the unemployed over much of 1975-1990 should not have been overwhelmingly unskilled. And, relative wages rose steeply out of the two depressions, when this theory would have predicted that they would have risen slowly at first, until absorbing the large numbers of unemployed more-educated workers.

I tested the potential depressing effect of unemployment on relative wages in Robbins(1994A). If, for some reason, unemployment exerts asymmetric pressure on wages, then measures of changes in relative labor supply that include unemployed workers should move in the opposite direction to relative wage changes. I explored this hypothesis by looking at the inner product between the vector of relative supply changes for different sex-school-experience groups with the corresponding vector of the changes in the relative wages of these groups. If supply was driving the wage changes the inner product should be negative. However, I found a positive inner product for most periods between 1975-1992, with negative inner products only during recessions. Further, this result held both for a narrow definition of supply and for a broad definition that included unemployed persons.

In addition to doubts about the major premise of the argument, the logic linking unemployment to asymmetric pressures on wages appears flawed. In a market with flexible wages and no mis-match in the demand for and supply of workers, unemployment should be low and arising from frictional causes. And if wage rigidity causes unemployment, then unemployment does not affect wages. This simple point merits emphasis. And clearly, if

minimum wages cause unemployment, then unemployment does not affect wages. The confusion arises because in disequilibrium high unemployment will bring down wages - and thereby eliminated unemployment at equilibrium with flexible wages. Over this long period, however, a short-run disequilibrium argument is clearly unwarranted.

If instead of downwardly rigid wages, the source of some of aggregate unemployment is mis-match in the labor market, then unemployed workers will not exert downward pressure on wages in expanding sectors, because they are not in demand by those sectors. In other sectors, if wages are downwardly flexible the labor market should clear, and if wages are downwardly rigid, then their unemployment will not exert pressure on wages, as discussed above.

Last but not least, the path of unemployment over this period simply does not track relative wage movements well. If one were to accept the argument that unemployment drove relative wages up, then relative wages should have risen during the depression in the early 1980's. However, precisely the opposite occurred. Subsequently, unemployment began a gradual descent, but instead of lowering relative wages, I find they continued to climb.

Implicit Contract Theories

The theoretical literature on the cyclic behavior of relative wages makes no mention of unemployment exerting pressure on the wages of employed - for the reasons I outlined above, that unemployment derives from wage rigidity. Instead, theories of cyclic variation in wages focus on implicit contracts across the cycle deriving from the presence of specific human capital [there are two schools approaches: first Azariadis(1975,1976), Baily(1974), Gordon(1974); second, Hashimoto(1981), Raisian(1983)]. This specific human capital based

theory is indeterminate. The evidence suggests that there is no consistent pattern of skill differentials over the cycle (Keane and Prasad, 1993). Moreover, these arguments pivot on specific human capital, and the wages of a large group who never lose their job over the cycle. The cycle in Chile was so large, however, that most of those highly educated workers receiving growing wages were not present across the cycle, so specific human capital arguments would not apply.

In summary, one can reject each of these alternative explanations of the source of relative wage changes over 19751990. I conclude that rising relative wages of university educated versus less educated workers were due principally to a skill-biased pattern in the demand for labor. Next, I turn to the evidence on relative wages after 1990.

Have Relative Wages Begun to Fall?

Robbins(1994A) found that some indices of relative wages of university versus less educated workers showed a decline after 1990. This is important both for predicting coming trends, and relevant to the interpretation of the past. Was this dcclinc rcal? To thc extent it was, does 1990 mark a watershed where the skill-bias of demand growth wanes, and the wages of less educated workers begin a secular rise?

In interviews with Chilean education economists I was alerted to the possibility that measures of returns to university education after 1990 may reflect the declining average quality of education, because of the entrance of graduates from lower quality private universities after 1990. Before 1980 university education was dominated by the “traditional” universities (in Greater Santiago these include the University of Chile and the Catholic University) which receive state subsidies. After 1980, there was a rapid growth of private

universities, with many of their graduates entering the labor in large numbers after 1990 (I return to this issue below in the discussion of equity of access to university education). A widespread impression in Chile is that these universities, whose professors are often only part time, provide education of lower quality than provided by the traditional universities.

The issue of quality differences across private and public universities, and the other diverse forms of higher education, is largely uncharted. This is due to several factors: the relative newness of the issue (a possible bias among some in Chile in favor of decentralization and privatization of educational services in Chile) and crucially, because labor force surveys in Chile do not currently distinguish between the type of university attended, average measures of returns to university education after 1990 could partly reflect falling average quality of education, rather than falling relative wages for workers with uniform university educations.

To examine the hypothesis that **measured** falling returns to university education are downwardly biased and due to falling average quality, I tested to see if there were different patterns in the changes in relative earnings for workers with university educations according to their level of experience. If falling measured returns to university education are due to declining quality, then a necessary condition is that the wages of younger workers with university education would decline further than older workers with university educations. Table 6 reports real wages for different sex-education-experience groups (wages within cells are divided by an aggregate of total wages using a constant demographic composition for comparison across years), In the 1990-92 period, the relative wages of younger university educated male workers, with less than six years experience declined by 14.5 percent, while the wages of university educated male workers with more experience declined only 3.7

percent. The wages of females with university education with less than six years of experience declined 24.9 percent, while the wages of the corresponding females with more experience rose 13.2 percent.

Table A Real Weekly Wage Changes for Full-Time Workers in Chile, 1960-92

Percent Change in Real Weekly Wage
(multiplied by 100)

GROUP	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-92
Education and Experience: Males							
Basic							
Incomplete							
Experience > = 6	12.9	38.7	-72.7	57.9	-35.5	32.1	17.7
Complete							
Experience < = 5	110.7	-5.1	-78.9	95.5	-39.4	23.8	59.2
Experience > = 6	7.1	43.3	-78.9	68.1	-36.2	35.4	23.7
Secondary							
Incomplete							
Experience < = 5	46.4	-13.1	213.3	-79.8	-44.1	49.2	14.7
Experience > = 6	7.3	20.7	-74.9	73.5	-43.5	18.9	20.0
Complete							
Experience < = 5	63.3	5.0	-76.1	62.2	47.9	58.2	20.9
Experience > = 6	22.1	38.2	-81.6	117.1	-35.7	-0.5	5.4
University							
Experience < = 5	-17.5	75.5	-78.3	72.6	-18.7	54.0	-14.5
Experience > = 6	57.1	273	-84.0	168.1	-39.2	68.3	-3.7
Special							
Experience < = 5	10.5	27.8	-75.1	143.7	-51.4	21.5	51.4
Experience>=6	50.2	48.8	-81.2	77.4	-29.9	28.6	25.3
Education and Experience: Females							
Basic							
Incomplete							
Experience>=6	22.7	415	-70.3	98.5	-34.6	25.8	40.7
Complete							
Experience < = 5	-30.1	-15.2	43.6	73.5	-59.8	81.1	84.3
Experience >= 6	59.5	10.0	-68.2	9.5	-29.0	37.5	47.9
Secondary							
Incomplete							
Experience <= 5	47.1	48.8	-57.4	23.0	-35.8	63.2	16.3
Experience>=6	52.6	-11.7	-78.9	120.2	-54.7	59.2	13.1
Complete							
Experience<=5	64.7	29.2	-77.2	81.2	-46.2	17.5	27.1
Experience>=6	28.5	22.9	-76.4	67.8	41.1	33.8	13.2
University							
Experience < = 5	61.4	54.4	-83.8	154.8	-36.1	101 .o	-24.9
Experience>=6	47.8	58.6	-82.7	98.1	-23.8	38.9	13.2
Special							
Experience <= 5	47.6	16.6	-76.7	152.9	-46.9	30.9	15.2
Experience > = 6	10.1	37.1	-73.7	55.0	-36.0	49.7	22.8

A fuller treatment that separates the type of university education within cohort groups is required to attain definitive understanding of the role of quality. However, these results agree with the hypothesis that the emergence of private, lower-quality universities explains a significant portion of decreases in the measured wage gap between the university graduates and less educated workers after 1990. Declines in the wages of graduates of traditional universities over 1990-1992 were likely smaller than average measures based on all university graduates - and may have not declined at all. It would be surprising in this period of rapid growth and apparent productivity increases, if real wages for a consistently defined group of university graduates declined at all. Further research is clearly needed to carefully examine the changing quality and changing returns to higher education for different private versus public groups, and to examine other factors, such as the rate of new university graduate entrants into the labor market (although the overall increase in university graduates appears to have been gradual in this period). Overall the results here are consistent with the widespread impression in Chile that the rapidly rising proportion of private university graduates are of lower quality, and that, therefore, the decrease in real and relative wages of university graduates may be significantly overstated.

SUMMARY

I find that the principal alternative hypotheses that might explain my findings for Chile do not withstand scrutiny and conclude that relative wages grew over 1990-1992 because of skill-biased demand for labor. Moreover, the apparent decrease in relative wages after 1990 is likely overstated, because of the declining average quality of university education.

SECTION 5 - CONCLUSION

It is commonly hypothesized that moving from IS1 to liberalized trade will increase the demand for goods intensive in unskilled labor. The argument is that trade liberalization shifts the composition towards goods intensive in unskilled labor (raising the relative demand for unskilled versus skilled labor) and increases the relative wages of unskilled labor. This change in relative prices from the between-industry recomposition of output, would then cause a second-order substitution towards more skilled labor within industries. In sum, this line of reasoning make two predictions: first, that trade liberalization will compress relative wages, and, second, that trade liberalization will cause second-order substitution of skilled for unskilled labor within industries.

My examination leads us to reject these hypotheses - at least over the medium-run - for the Chilean case. My earlicr work showcd, contrary to the above hypothesis, relative wages moved in favor of more educated workers in the aftermath of trade liberalization. Moreover, this earlier work found that the widening relative wage structure was not due to relative supply changes, nor was it likely due to domestic reforms. I concluded, therefore, that demand changes in the post-1974 period must have moved to favor more educated workers.

This paper demonstrated that the distribution of employment across industries, while experiencing many short-run changes, was not fundamentally different in 1992 than it was in 1960. Nor were the changes in this distribution in the post-1974 period fundamentally different than those underway in the mid-1960's. These findings suggest that within-industry changes were the key to the observed relative wage changes. The importance of within-industry demand changes was supported by my examination of the distributions of schooling

within industries, and of the distribution of occupations within industries, where significant educational and occupational upgrading was observed. Finally, my formal disaggregation of demand changes affirmed the key role of within-industry demand changes favoring more educated workers over the 1974-1990 period. Rising relative wages for university graduates in the post-reform period are best explained by within-industry occupational changes and within occupation changes towards more educated (particularly university-educated) workers.

At first glance there is a resemblance between these findings, for the 1974-1990 period, and the two predictions of trade theory mentioned above. As predicted, measured between-industry shifts tended to move away from industries intensive in university-educated workers. And, as predicted, there is a substitution towards more educated workers. However, this resemblance is only superficial. Contrary to these predictions, between-industry changes are weak, while within-industry changes drive wage changes. And while the predicted within-industry substitutions should be driven by falling relative wages for more educated workers, I observe rising relative wages.

These results for Chile suggest the customary prediction that trade liberalization improves the relative wage distribution may - at least for some countries - be incorrect. The generality of these results to other countries remains to be shown. But, because Chile has been widely cited in favor of trade liberalization elsewhere, these results should not be simply dismissed as idiosyncratic.

I have established that within-industry skill and occupational upgrading occurred, and that this was not due to between-sector shifts in the composition of output and demand for labor. But what were the causes of these within-industry demand shifts? While this question exceeds the scope of the current study, I can offer some speculation on this point. In the

U.S. and OECD countries economists have observed, to varying extent, widening relative wage structures and concluded that skill-biased technological change is responsible [Levy and Murnane(1992); Katz and Murphy(1992); Berman, Bound and Griliches(1992); OECD(1993), to mention only a few)]. More modern capital and production methods appear to be increasingly skill-intensive. If trade liberalization leads to modernization of capital, then trade liberalization may spawn large increases in the relative demand for more skilled labor.

But why should trade liberalization lead to modernization of capital? Traditional discussions of protectionist regimes argue that protectionism is characterized by over-valued exchange rates and tariffs that shield domestic production of tradeable goods while allowing capital goods in freely. Thus, under protectionism, prices are distorted in favor of imported capital goods, and trade liberalization ought not lead to greater levels of or modernization of physical capital.

However, this story may be wrong in some assumptions, incomplete or both. A key assumption in the story that could be questioned is whether capital goods are cheaper under IS1 regimes. While there is evidence [Krueger(1990)] supporting this claim, some goods that are key to modernization and imply skill-intensiveness - notably computers and electronic devices - may not have been categorized as capital goods in the studies cited by Krueger(1990), and may face high tariffs and/or quotas under protection. Trade liberalization may make it easier and cheap to import these, and their effect could permeate manufacturing, services and commerce. The argument may also be incomplete. Trade liberalization could lead to modernization of physical capital for two reasons. First, trade liberalization and export-promotion should free-up the capital constraints restricting the level of imports of capital goods, allowing faster growth in capital goods imports, and diminishing the rationing

of foreign exchange and resultant market segmentation. Higher levels of capital imports would lead to modernization. Second, competition may increase, and lead to modernization of production. Diminished market segmentation would enhance competition between domestic firms. And, as often argued, liberalized trade would also increase the competition on domestic producers; and heightened competition would tend to force domestic producers to be more efficient, driving them to modernize production techniques and thereby increase their skill-intensiveness.

Further research is needed to deepen many of the insights this work has provided and to answer many of the questions it raises. Four key areas of further research can be pointed out. First, research on other countries is needed to determine whether the Chilean experience generalizes to other countries. Second, more work is required to strengthen the link between trade liberalization policies, the trade outcomes and their impact on the labor market. Third, it is important to gain a deeper understanding of changes in the hypothesized modernization and related factor usage within industries and firms'. And, fourthly, more research is required to determine whether - for Chile and elsewhere - my speculations regarding the causes of within-industry skill-upgrading are well founded.

These findings for Chile have potentially important implications for education policies (these issues are discussed more completely in Robbins(1990C)). Trade liberalization may, in some circumstances, lead to heightened demand for more educated labor, even university educated labor. If so, ensuring rapid growth in the supply of workers with higher education may be crucial to guarantee both sustained growth and an equitable distribution of wage

[5] A recent study by Bosworth and Marfán(1993) argues there is scant evidence of productivity growth in post-reform Chile. A much more disaggregated analysis is needed to show this more convincingly, however.

incomes. The rising overall rates of return to education suggests rising scarcity of overall education, and the rising premium to university education suggests a growing gap between the demand for and supply of university graduates. This suggests that larger supplies of educated workers (and, particularly, university-educated workers) have contributed to higher growth rates of output.

Since I have established [Robbins(1994A)] that demand out-paced supply for university graduates in the post-1974 period, the large redistribution of government spending on education away from higher education may have been excessive. While the generation of more primary and secondary graduates relative to university graduates tends to equalize the relative earnings distribution for a constant wage structure, the relative wages of more educated workers tend to grow as their relative supply is restricted Ironically, then, Chile's post-1974 redistribution of educational spending away from university education may have actually contributed to greater earnings inequality.

A larger supply of university graduates would have counteracted the upward pressure on relative wages caused by trade liberalization. Loans and grants can be used to increase the supply of university educated workers and correct for capital market imperfections that make it hard for poorer families to borrow towards university education. It appears, however, that the structure of loans and grants is only modestly progressive [see Larrañaga(1992)]. Thus, a program of more money towards educational loans and scholarships could aid educational access for the poor, lower the dispersion of earnings (by compressing the relative earnings structure) and enhance economic growth by eliminating the apparent shortfall of university educated workers. Finally, although since 1980 there has been an rapid growth in the number of private universities (and, more recently, of their graduates) most of the students in

these schools came from the top fifth of the income distribution. This private sector provision of university education may aid growth and reduce wage inequality, through its effect on the rate of return to schooling, but it appears-to only have exacerbated the inequality of access to university education. Optimal education policy for Chile, that maximizes economic growth and incomes while minimizing the disparity of earnings, may require significantly more spending on loans and grants for university education. One last issue which merits scrutiny concerns the quality of the new private universities - widely believed to be inferior to the *traditional' universities - which continue to receive state subsidies. These questions are key issues requiring further research for Chile and are relevant to other countries as well.

A last issue for future research on educational policy relates to the 'New' growth economics and is largely unexplored for Chile. How important was Chile's relatively high endowment of education - in particular, its university education - for the success of its trade liberalization policy. Did Chile's comparative advantage, and resulting pattern of trade, lie partly in its higher levels of education? And, how important was higher education to Chile's ability to modernize and innovate?

APPENDIX A:

THE DISTRIBUTION OF SCHOOLING GROUPS ACROSS INDUSTRIES: 1957-1992

Table 1. Average Distribution of Hours for Eight Demographic Groups Across Industries
Panel 1: Males

INDUSTRY	SCHOOL	1957-1965	1966-1970	1971-1973	1974-1976	19% 1979	1980-1981	1982-1983	1984-1986	198% 1989	1990-1992
1	1	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	2	0.02	0.02	0.02	0.03	0.02	0.01	0.02	0.02	0.02	0.02
1	3	0.06	0.11	0.09	0.09	0.09	0.08	0.05	0.08	0.10	0.08
1	4	0.05	0.04	0.03	0.05	0.03	0.03	0.03	0.03	0.02	0.02
2	1	0.15	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
2	2	0.08	0.09	0.09	0.12	0.11	0.11	0.16	0.11	0.14	0.12
2	3	0.02	0.01	0.02	0.03	0.01	0.03	0.02	0.01	0.01	0.01
2	4	0.10	0.15	0.15	0.14	0.16	0.17	0.17	0.14	0.14	0.17
3	1	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	2	0.08	0.09	0.10	0.08	0.10	0.10	0.01	0.09	0.10	0.08
3	3	0.02	0.03	0.06	0.05	0.04	0.07.	0.02	0.04	0.03	0.06
3	4	0.08	0.04	0.04	0.03	0.04	0.03	0.00	0.06	0.03	0.03
4	1	0.07	0.12	0.12	0.11	0.11	0.10	0.10	0.09	0.10	0.13
4	2	0.05	0.06	0.08	0.08	0.09	0.06	0.07	0.08	0.07	0.09
4	3	0.04	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	4	0.07	0.11	0.20	0.17	0.21	0.12	0.13	0.13	0.19	0.19
5	1	0.07	0.08	0.07	0.09	0.08	0.06	0.09	0.08	0.07	0.09
5	2	0.04	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5	3	0.04	0.07	0.05	0.07	0.06	0.03	0.07	0.06	0.06	0.06
5	4	0.07	0.09	0.10	0.09	0.09	0.08	0.01	0.08	0.09	0.06
6	1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
6	2	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00
6	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1	0.10	0.21	0.20	0.22	0.19	0.26	0.00	0.20	036	0.23
7	2	0.05	0.05	0.06	0.07	0.05	0.07	0.08	0.06	0.09	0.09
7	3	0.14	0.15	0.14	0.13	0.15	0.15	0.10	0.11	0.11	0.11
7	4	0.04	0.06	0.06	0.07	0.07	0.08	0.05	0.06	0.09	0.06
8	1	0.22	0.30	0.30	0.30	0.33	0.30	0.50	034	031	0.30
8	2	0.26	0.28	0.25	038	0.26	0.29	0.28	0.26	0.27	0.26
8	3	0.11	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.""	0.00
8	4	0.22	0.09	0.05	0.05	0.05	0.10	0.13	0.10	0.11	0.12

9	1										
9	2										
9	3			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	4	[illegible]	[illegible]	0.00	0.08	0.00	0.05	0.00	0.00	0.06	0.03	0.05
				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1											
10	2											
10	3											
10	4	12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	1		0.06	0.12	0.13	0.11	0.12	0.10	0.12	0.11	0.11	0.09
11	2		0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	3		0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
11	4		0.02	0.02	0.03	0.04	0.03	0.03	0.02	0.03	0.02	0.04
12	1		0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
12	2		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01
12	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1											
13	2											
13	3											
13	4	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	1		0.03	0.04	0.05	0.03	0.05	0.05	0.03	0.04	0.03	0.04
14	2		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	3		0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	4		0.02	0.02	0.02	0.01	0.01	0.02	0.04	0.03	0.03	0.03
15	1		0.04	0.04	0.05	0.05	0.04	0.04	0.07	0.05	0.03	0.03
15	2		0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.05	0.04	0.03
15	3		0.23	0.40	0.41	036	039	039	037	036	0.35	036
15	4		0.08	0.09	0.10	0.09	0.09	0.10	0.06	0.09	0.07	0.09
16	1		0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	2		0.14	0.16	0.15	0.18	0.16	0.20	0.19	0.15	0.16	0.15
16	3		0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.01
16	41		0.14	0.21	0.22	0.26	0.22	0.24	0.35	0.23	0.21	0.19

Panel 2: Females

INDUSTRY	SCHOOL	1957-1965	1966-1970	1971-1973	1974-1976	1977-1979	1980-1981	1982-1983	1984-1986	1987-1989	1990-1992
1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	3										
1	4										
2	1	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	2	0.03	0.02	0.02	0.03	0.03	0.02	0.01	0.00	0.04	0.03
3	3	1	0.14	0.22	0.21	0.21	0.17	030	0.14	0.15	0.17	0.20
3	4										
4	1	0.01									
4	2	0.01	0.04 0.02	0.04 0.01	0.06 0.01	0.03 0.01	0.04 0.01	0.02 0.01	0.02 0.01	0.03 0.01	0.03 0.01
4	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2										
5	3	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	4	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1										
6	2										
6	3										
6	4										
7	1	0.00	0.00	0.00	0.00	0.00	0.0,	0.00	0.00	0.00	0.00
7	2	0.02	0.03	0.04	0.02	0.03	0.02	0.02	0.01	0.02	0.02
7	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	4	0.03	0.02	0.03	0.02	0.01	0.04	0.00	0.00	0.01	0.0,
8	1										
8	2										
8	3										
8	4										

9	1										
9	2										
9	3										
9	4										
10	1										
10	2		0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
10	3		0.10		0.08				0.12		
10	4		0.06	0.00	0.10	0.10	0.1,	0.21	0.20	0.24	0.21	0.25
11	1										
11	2						0.00				
11	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1		0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.03	0.02	0.03
12	2		0.06	0.02	0.00	0.01	0.01	0.01	0.02	0.00	0.01	0.0,
12	3		0.00									
12	4		0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1		0.6,	0.66	0.66	0.64	0.70	0.65	0.7,	0.7,	0.7,	0.69
13	2		0.03	0.09	0.13	0.15	0.23	0.19	0.28	039	0.33	032
13	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.00
13	4		0.03	0.05	0.03	0.06	0.06	0.05	0.06	0.04	0.04	0.05
14	1		0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
14	2		0.04	0.08	0.06	0.05	0.03	0.05	0.04	0.04	0.06	0.06
14	3		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	4		0.03	0.03	0.04	0.04	0.04	0.07	0.03	0.04	0.03	0.03
15	1			0.03	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.03
15	2											
15	3		0.28			0.00						
15	4		0.42	050	053	0.54	0.47	0.47.	0.40	039	0.41	0.36
16	1		0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00
16	2		0.07	0.09	0.08	0.09	0.07	0.06	0.07	0.05	0.06	0.06
16	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	4		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Industry Codes: 1 Agriculture, Mining Fishing; 2 Wood and Paper Manufacturing; 3 Textiles; 4 Metallurgy & Machinery; 5 Chemicals & Petroleum Products; 6 Other Industry; 7 Construction; 8 Commerce; 9 Public Administration & Military; 10 Financial Services and Real-estate Services; 11 Services: Repair; 12 Services: Personal; 13 Services: Domestic; 14 Services: Sanitation & Social; 15 Services: Education & Health; 16 Transportation & Public Utilities: 17 Other
- Schooling Groups: 1 Primary; 2: Secondary; 3: University; 4: Special

Table 2a. Average Distribution of Hours For Eight Demographic Groups across Occupations
Panel 1: Males

Occup'n	School	1957 to 1965	1966 to 1970	1971 to 1973	1974 to 1976	1977 to 1979	1980 to 1981	1982 to 1983	1984 to 1986	1987 to 1989	1990 to 1992	1990	1991	1992
1	1	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	2	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.01
1	3	0.04	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.01	0.01	0.01	0.02
1	4	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2	0.05	0.04	0.04	0.04	0.03	0.03	0.05	0.04	0.03	0.04	0.04	0.04	0.03
2	3	0.70	0.82	0.81	0.80	0.76	0.80	0.76	0.78	0.75	0.77	0.76	0.70	0.72
2	4	0.26	0.25	0.29	0.25	0.27	0.26	0.26	0.27	0.24	0.25	0.25	0.31	0.30
3	1	0.23	0.07	0.08	0.06	0.07	0.06	0.10	0.08	0.08	0.08	0.06	0.08	0.08
3	2	0.61	0.57	0.58	0.53	0.52	0.50	0.49	0.45	0.45	0.45	0.38	0.39	0.49
3	3	0.26	0.17	0.18	0.19	0.22	0.19	0.24	0.21	0.24	0.22	0.24	0.29	0.26
3	4	0.38	0.39	0.36	0.40	0.40	0.37	0.47	0.40	0.39	0.41	0.44	0.40	0.36
4	1	0.73	0.92	0.92	0.93	0.92	0.94	0.90	0.92	0.92	0.92	0.94	0.91	0.92
4	2	0.32	0.37	0.37	0.42	0.44	0.45	0.44	0.50	0.51	0.50	0.57	0.56	0.46
4	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	4	0.34	0.36	0.35	0.35	0.33	0.37	0.26	0.32	0.38	0.33	0.31	0.30	0.34

Table 2b. Average Distribution of Hours For Eight Demographic Groups across Occupations
Panel 2: Females

OCCUP'N	SCHOOL	1957to1965	1966 to 1970	1971 to 1973	1974 to 1976	1977 to 1979	1980 to 1981	1982 to 1983	1984 to 1986	1987 to 1989	1990 to 1992	1990	1991	1992
1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	3	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2	0.17	0.05	0.04	0.07	0.06	0.05	0.06	0.06	0.00	0.03	0.04	0.00	0.04
2	3	0.84	0.88	0.90	0.91	0.91	0.96	0.93	0.93	0.94	0.92	0.94	0.94	0.89
2	4	0.50	0.25	0.35	0.25	0.30	0.26	0.41	0.33	0.29	0.28	0.29	0.29	0.26
3	1	0.09	0.09	0.11	0.13	0.11	0.02	0.10	0.12	0.11	0.12	0.11	0.14	0.01
3	2	0.60	0.78	0.79	0.80	0.75	0.76	0.82	0.77	0.77	0.73	0.82	0.77	0.77
3	3	0.14	0.12	0.10	0.09	0.09	0.04	0.07	0.07	0.06	0.08	0.06	0.06	0.11
3	4	0.26	0.24	0.24	0.27	0.36	0.36	0.26	0.37	0.35	0.33	0.50	0.33	0.39
4	1	0.87	0.91	0.89	0.87	0.89	0.98	0.98	0.88	0.89	0.88	0.89	0.86	0.99
4	2	0.23	0.17	0.17	0.13	0.19	0.19	0.12	0.17	0.23	0.23	0.14	0.23	0.19
4	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	4	0.25	0.50	0.41	0.48	0.34	0.38	0.33	0.29	0.36	0.39	0.22	0.38	0.35

Occupational Groups: I Managers; 2 Professional; 3 Sales & Clerical; 4 Productton and Service Workers; 5 Military; 9 Uther
Schooling Groups: 1 Primary; 2: Secondary; 3: University; 4: Special

APPENDIX B:

The Distribution of Total Employment Across Industries

Table 3. Average Distribution of Employment (hours) by Industry and Occupation
Panel A: Industries

	Intervals										
INDUSTRY	1957 - 1965	1966 - 1970	1971 - 1973	1974 - 1976	1977 - 1979	1980 - 1981	1982 - 1983	1984 - 1986	1987 - 1989	1990 - 1992	1957 - 1992
1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02
2	0.09	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.05	0.04	0.10
3	0.11	0.10	0.11	0.09	0.09	0.09	0.06	0.08	0.10	0.09	0.11
4	0.04	0.07	0.07	0.07	0.07	0.06	0.05	0.05	0.05	0.07	0.05
5	0.04	0.04	0.04	0.05	0.04	0.03	0.03	0.03	0.03	0.04	0.03
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.06	0.09	0.08	0.11	0.08	0.11	0.03	0.08	0.10	0.09	0.07
8	0.17	0.16	0.15	0.17	0.16	0.17	0.20	0.17	0.16	0.16	0.16
9	0.02	0.03	0.03	0.01	0.03	0.01	0.02	0.04	0.01	0.02	0.03
10	0.04	0.04	0.05	0.05	0.05	0.06	0.08	0.07	0.07	0.07	0.05
11	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
12	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01
13	0.22	0.22	0.21	0.18	0.20	0.18	0.22	0.20	0.20	0.18	0.16
14	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
15	0.07	0.08	0.10	0.09	0.10	0.10	0.11	0.10	0.10	0.09	0.08
16	0.06	0.05	0.05	0.06	0.06	0.07	0.07	0.06	0.06	0.06	0.07
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Industry Codes: 1 Agriculture, Mining Fishing; 2 Wood and Paper Manufacturing; 3 Textiles; 4 Metallurgy & Machinery; 5 Chemicals & Petroleum Products; 6 Other Industry; 7 Construction; 8 Commerce; 9 Public Administration & Military; 10 Financial Services and Real-estate Services; 11 Services: Repair; 12 Services: Personal; 13 Services: Domestic; 14 Services: Sanitation & Social; 15 Services: Education & Health; 16 Transportation & Public Utilities; 17 Other.

Table 4. Percent Changes of Employment Distributions over Industries and Occupations

Panel B: Occupations

	Intervals								
	1957	1971	1974	1980	1984	1987	1957	1984	1974
Occupation	1970	1976	1979	1983	1989	1992	1992	1992	1992
1	-0.24	0.04	-0.02	0.18	0.31	0.01	-0.25	0.33	0.19
2	-0.16	-0.04	0.12	0.16	-0.05	0.04	0.38	-0.01	0.33
3	-0.13	0.002	-0.00	0.26	-0.02	0.00	0.01	-0.02	0.04
4	0.08	-0.00	-.02	-0.11	0.02	-0.01	-0.05	0.01	-0.06

Occupational codes: 1 Managers ;2 Professional ;3 Sales & Clerical ;4 Production and Service Workers ;5 Military ;9 Other.

Notes: Occupations 5 and 9 were omitted because of small values.

APPENDIX C :

Changes in the Distribution of Schooling Within Industries and Occupations, 1957-1992

Table 5. Changes in the Distribution of Schooling Within Industries

INDUSTRY	SCHOOL	1960 - 1968	1968 - 1972	1972 - 1975	1975 - 1980	1980 - 1982	1982 - 1985	1985 - 1991	1960 - 1991	1975 - 1991
1	1	-0.54	0.00	0.00	0.00	0.00	0.00	0.00	-0.54	0.00
1	2	0.24	0.06	-0.02	-0.08	0.12	-0.05	0.04	0.30	0.03
1	3	0.28	-0.02	-0.06	0.16	-0.12	0.05	-0.01	0.29	0.09
1	4	0.03	-0.04	0.08	-0.08	0.00	0.00	-0.03	-0.05	-0.11
2	1	-0.75	-0.04	-0.01	0.03	-0.08	0.04	0.00	-0.80	0.00
2	2	0.54	0.03	0.01	0.02	0.14	-0.05	-0.07	0.62	0.04
2	3	0.01	0.01	0.02	-0.01	-0.01	-0.01	0.00	0.01	-0.03
2	4	0.20	-0.01	-0.02	-0.05	-0.05	0.02	0.07	0.16	-0.01
3	1	-0.14	-0.08	-0.02	-0.07	0.11	-0.20	0.05	-0.34	-0.10
3	2	0.13	0.06	0.02	0.10	0.11	0.14	-0.06	0.29	0.08
3	3	0.01	0.03	0.00	-0.01	0.02	0.00	0.02	0.05	0.02
3	4	0.00	-0.01	0.00	-0.02	-0.02	0.05	0.00	0.00	0.01
4	1	-0.08	-0.09	0.01	-0.02	-0.07	-0.05	0.03	-0.27	-0.11
4	2	0.05	0.08	-0.01	0.07	0.07	0.04	-0.07	0.22	0.11
4	3	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
4	4	0.06	0.02	0.00	-0.05	0.00	0.01	0.04	0.08	0.00
5	1	0.02	6.03	-3.02	-0.06	0.06	0.07	0.02	-0.09	-0.05
5	2	-0.11	0.01	0.02	0.07	-0.05	0.01	0.01	-0.03	0.05
5	3	0.05	0.00	0.01	-0.01	0.08	-0.03	-0.01	0.09	0.03
5	4	0.04	0.02	-0.01	0.00	-0.09	0.09	-0.02	0.03	-0.02
6	1	-0.01	-0.14	0.28	6.14	-0.15	0.10	0.05	-0.01	-0.15
6	2	0.01	0.14	-0.28	0.14	0.15	-0.10	-0.05	0.01	0.15
6	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1	-0.01	-0.07	0.03	-0.05	-0.09	0.62	-0.02	-0.18	-0.14
7	2	0.02	0.04	-0.02	0.03	0.54	-0.47	0.03	0.16	0.12
7	3	-0.01	0.02	-0.03	0.02	0.14	-0.13	-0.01	0.02	0.02
7	4	0.01	0.00	0.00	4.01	0.02	-0.02	0.01	0.01	0.00
8	1	-0.14	-0.02	0.03	-0.11	0.06	-0.08	-0.04	-0.29	-0.16
8	2	0.17	0.02	-0.03	0.10	-0.08	0.07	0.01	0.27	0.11
8	3	-0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
8	4	-0.01	-0.01	-0.01	0.01	0.01	0.01	0.02	0.02	0.04

9	1	-0.08	-0.02	0.27	-0.06	0.15	-0.20	-0.13	-0.07	-0.24
9	2	0.27	6.02	-0.38	0.04	-0.06	0.26	0.04	0.15	0.28
9	3	-0.15	0.03	0.06	-0.03	-0.03	-0.06	0.08	-0.09	-0.03
9	4	-0.04	0.00	0.04	0.05	-0.06	0.00	0.01	0.00	-0.01
IO	1	-0.34	0.00	0.01	-0.01	-0.02	0.01	-0.01	-0.36	-0.03
10	2	0.27	-0.01	-0.06	-0.07	0.06	-0.08	-0.06	0.05	-0.15
10	3	0.11	0.01	0.05	0.05	-0.01	0.01	0.05	0.25	0.10
10	4	-0.03	0.01	0.00	0.03	0.03	0.05	0.03	0.06	0.08
11	1	0.16	-0.01	-0.01	0.01	0.02	-0.02	-0.03	0.12	-0.02
11	2	-0.17	0.00	0.00	0.00	0.00	0.00	0.00	6.17	0.00
11	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	4	0.01	0.01	0.01	-0.01	-0.02	0.02	0.03	0.05	0.02
12	1	0.07	-0.03	0.10	-0.03	-0.13	-0.05	-0.01	-0.08	-0.22
12	2	-9.08	0.04	-0.07	0.03	0.13	0.04	4.02	0.07	0.18
12	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	4	0.01	-0.01	-0.02	0.00	0.00	0.01	0.02	0.01	0.04
13	1	-0.02	-0.02	-0.01	-0.03	-9.06	-0.04	0.02	-9.16	-0.11
13	2	0.02	0.02	0.01	0.03	0.06	0.04	-0.02	0.15	0.11
13	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	4	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00
14	1	0.07	0.04	-0.0,	-0.01	-3.13	0.00	0.04	0.01	-0.10
14	2	-0.04	-0.05	0.00	0.00	0.09	-0.05	0.02	-0.01	0.07
14	3	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.07	0.00
14	4	0.03	0.01	0.01	0.01	0.04	0.05	-0.06	0.08	0.03
15	1	-0.16	-9.03	0.04	-0.10	0.02	-9.03	-0.05	-0.31	-0.16
15	2	-0.08	0.01	-9.05	0.04	0.01	0.01	-0.03	-0.09	0.03
15	3	0.17	0.03	-0.01	0.12	-0.01	-0.01	0.05	0.33	0.15
15	4	0.07	-0.01	0.02	-0.06	-9.03	0.04	0.04	0.07	-0.02
0 16	1	-9.57	1	-0.03	0.02	0.00	-0.01	0.00	'6.58	0.01
16	2	0.46	-0.01	-0.01	0.09	-0.03	0.00	0.01	0.50	0.07
16	3	0.00	0.00	-0.01	0.00	0.00	0.02	-0.02	-0.01	0.00
16	4	0.11	0.00	0.05	6.10	0.02	-0.01	0.01	0.08	-0.0%
17	1	-0.18	0.01	0.13	-0.63	0.34	0.66	-0.82	6.49	-0.45
17	2	0.30	-0.01	-0.13	0.63	-0.34	0.66	0.62	0.62	0.45
17	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	4	-0.13	0.00	0.00	0.00	0.00	0.00	0.00	-0.13	0.00

Intervals: All intervals are three-year centered averages, except "1980" and "1982",
which are two-year forwards averages (respectively "1980" averages 1980,1981 and "1982" averages 1982,1983).

Industry Codes: 1 Agriculture, Mining Fishing; 2 Wood and Paper Manufacturing; 3 Textiles; 4 Metallurgy & Machinery; 5 Chemicals & Petroleum Products; 6 Other Industry; 7 Construction; 8 Commerce; 9 Public Administration & Military; 10 Financial Services and Real-estate Services; 11 Services: Repair; 12 Services: Personal; 13 Services: Domestic; 14 Services: Sanitation & Social; 15 Services: Education & Health; 16 Transportation & Public Utilities; 17 Other

School Codes: 1 Primary; 2 Secondary; 3 University; 4 Special.

Table 6. Changes In the Occupational Distribution Within Industries

IND USTRY	OCC UPATION	1960 1968	1968 1972	1972 1975	1975 1980	1980 1982	1982 1985	1985 1991	1960 1991	1975 1991
1	1	0.00	-0.04	0.01	-0.04	0.09	-0.09	0.07	0.00	0.03
1	2	0.10	0.05	-0.12	0.04	-0.01	0.14	-0.06	0.11	0.10
1	3	-0.09	0.05	-0.06	-0.02	0.04	-0.02	0.07	-0.05	0.06
1	4	0.00	-0.05	0.18	0.02	-0.12	-0.02	-0.07	-0.07	-0.19
2	1	-0.01	0.00	0.00	0.00	-0.01	0.00	0.01	-0.01	0.00
2	2	0.00	0.03	-0.02	0.01	0.01	-0.01	0.00	0.01	0.01
2	3	-0.01	0.02	0.00	-0.01	-0.01	0.01	0.04	0.05	0.04
2	4	0.01	-0.04	0.02	0.00	0.01	0.00	-0.05	-0.05	-0.05
3	1	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00
3	2	0.00	0.01	-0.01	0.00	-0.01	0.02	0.00	0.01	0.01
3	3	0.01	0.02	-0.04	0.04	0.01	-0.02	-0.01	0.02	0.03
3	4	0.00	-0.02	0.04	-0.04	0.00	-0.01	0.01	-0.02	-0.04
[illegible]	[illegible]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	2	-0.07	0.00	0.04	-0.03	0.00	0.04	-0.03	-0.05	-0.02
4	3	0.03	0.02	0.01	-0.10	0.08	0.01	-0.03	0.01	-0.04
4	4	0.04	-0.02	-0.05	0.13	-0.07	-0.05	0.05	0.04	0.06
5	1	0.01	0.01	-0.01	0.02	0.00	-0.01	-0.01	0.01	0.00
5	2	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00
5	3	0.33	0.04	0.00	0.01	0.19	-0.23	-0.10	0.25	-0.12
5	4	-0.29	-0.05	0.02	-0.03	-0.19	0.24	0.11	-0.20	0.13
6	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00
6	3	4.10	0.07	-0.07	0.04	0.20	-0.18	-0.01	-0.05	0.05
6	4	0.16	-0.07	0.07	-0.04	-0.20	0.18	0.01	0.11	-0.05
7	1	0.00	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00
7	2	-0.06	0.03	-0.03	0.01	0.27	-0.25	-0.01	-0.04	0.02
7	3	-0.11	0.02	-0.03	0.00	0.11	-0.11	0.01	-0.11	0.01
7	4	0.16	-0.05	0.06	-0.01	-0.37	0.36	0.00	0.15	-0.03
8	1	0.00	0.00	0.00	0.00	0.00	-0.01	0.01	0.01	0.01
8	2	0.01	0.00	0.01	0.00	0.01	0.01	0.00	0.01	-0.01
8	3	-0.05	0.01	0.02	-0.01	0.13	-0.11	0.01	0.00	0.02
8	4	0.04	-0.01	-0.03	0.01	-0.14	0.13	-0.02	-0.02	-0.02

- 9 0	1 .	0 2	0.00	0.00	0.00	0.00	0.00	0.00	5.02	0.00
9	2	0.05	0.05	5.02	0.04	-0.11	0.00	0.11	0.13	0.05
9	3	0.22	5.04	-0.03	0.07	0.28	0.08	0.09	0.11	-0.05
9	4	-0.25	-0.01	0.05	-0.11	0.39	-0.08	-0.20	-0.21	0.00
10	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	2	0.04	0.01	0.02	0.05	5.04	0.06	0.02	0.16	0.09
10	3	0.06	0.00	5.04	5.04	0.03	-0.08	0.00	-0.07	-0.09
11	1	-0.10	-0.01	0.02	-0.01	0.01	0.02	5.02	-0.09	0.00
11	2								0.00	0.00
11	3								0.00	0.00
11	4	1							0.03	0.03
									-0.02	-0.03
12	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	2	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00
12	3	-0.10	0.01	0.01	-0.01	0.02	-0.01	0.01	-0.09	0.00
12	4	0.13	-0.01	-0.01	0.01	-0.02	0.01	-0.01	0.12	0.00
13	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	2	-0.04	0.04	0.03	-0.11	0.03	0.08	0.03	0.05	0.03
14	3	0.09	-0.04	0.04	-0.05	0.07	-0.04	0.00	0.07	-0.02
14	4	-0.03	0.00	-0.07	0.16	-0.10	-0.04	-0.03	-0.10	-0.01
14	9	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00
15	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	2	-0.05	-0.01	0.00	0.07	-0.01	0.01	0.02	0.03	0.09
15	3	0.14	0.02	0.00	-0.08	0.01	-0.01	0.00	0.09	-0.07
15	4	-0.09	-0.01	0.00	0.01	0.00	0.00	-0.03	-0.11	-0.02
16	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	2	-0.01	0.01	0.01	5.04	-0.01	0.04	0.00	0.00	5.02
16	3	-0.06	0.01	-0.01	5.04	0.02	0.02	-0.01	5.07	5.01
16	4	0.07	5.02	0.00	0.09	-0.01	5.06	0.01	0.07	0.02
17	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	3	-0.06	0.21	-0.37	0.12	5.53	1.00	5.21	0.17	0.39
17	4	0.06	-0.21	0.37	-0.12	0.53	-1.00	0.21	-0.17	-0.39

Intervals: All intervals are three-year centered averages, except "1980" and "1982", which are two-year forwards averages (respectively "1980" averages 1980.1981 and "1982" averages 1982,1983).

Industry Codes: 1 Agriculture, Mining Fishing; 2 Wood and Paper Manufacturing; 3 Textiles; 4 Metallurgy & Machinery; 5 chemicals & Petroleum products; 6 Other Industry; 7 Construction; 8 Commerce; 9 Public Administration & Military; 10 Financial Services and Real-estate Services; 11 Services: Repair; 12 Services: Personal; 13 Services: Domestic; 14 Services: Sanitation & Social; 15 Services: Education&Health; 16 Transportation & Public Utilities; 17 Other

Occupational Codes. 1 Managers ;2 Professional ;3 Sales & Clerical ;4 Production and Service Workers ;5 Military ;9 Other

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